











## 10. 20 dB Bandwidth

## 10.1 Block Diagram Of Test Setup



## 10.2 Limit

N/A

#### 10.3 Test procedure

- 1. Set RBW = 30kHz.
- 2. Set the video bandwidth (VBW)  $\ge$  3 x RBW.

NVNT NVNT NVNT NVNT NVNT **NVNT NVNT** NVNT **NVNT** 

3-DH1

- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

esult						
Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict		
NVNT	1-DH1	2402	0.917	Pass		
NVNT	1-DH1	2441	0.909	Pass		
NVNT	1-DH1	2480	0.921	Pass		
NVNT	2-DH1	2402	1.240	Pass		
NVNT	2-DH1	2441	1.240	Pass		
NVNT	2-DH1	2480	1.239	Pass		
NVNT	3-DH1	2402	1.204	Pass		
NVNT	3-DH1	2441	1.207	Pass		

1.208

Pass

### 10.4 Test Result

2480

Edition:

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PR





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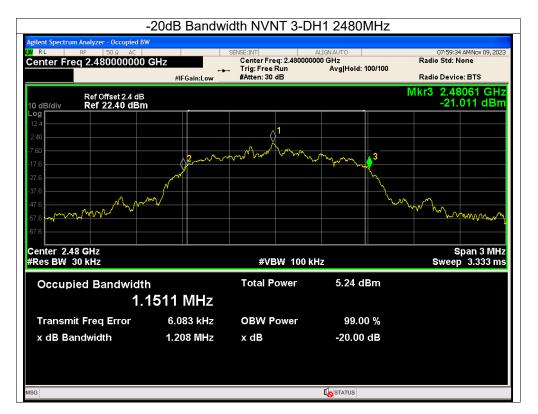
C 00.,LT













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## 11. Maximum Peak Output Power

## 11.1 Block Diagram Of Test Setup



## 11.2 Limit

FCC Part15 (15.247),Subpart C							
Section	Test Item	Limit	Frequency Range (MHz)	Result			
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS			

## 11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

### 11.4 Test Result

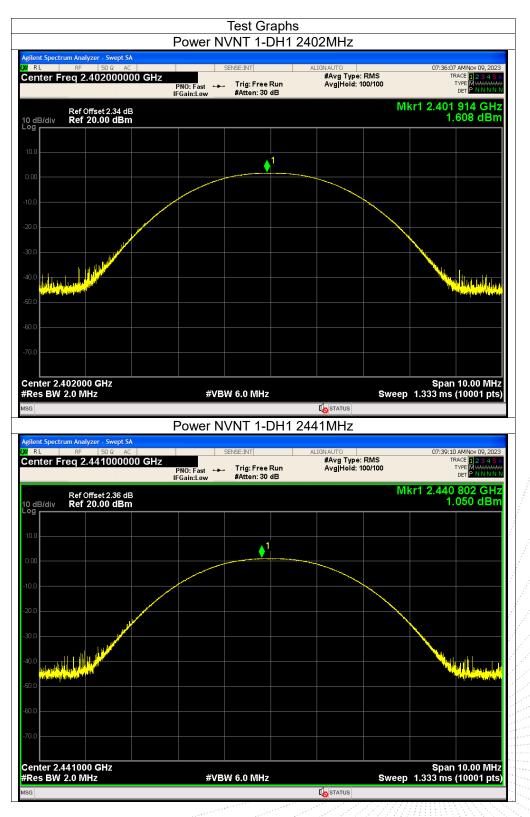
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	1.61	21	Pass
NVNT	1-DH1	2441	1.05	21	Pass
NVNT	1-DH1	2480	0.00	21	Pass
NVNT	2-DH1	2402	2.18	21	Pass
NVNT	2-DH1	2441	1.56	21	Pass
NVNT	2-DH1	2480	0.47	21	Pass
NVNT	3-DH1	2402	2.99	21	Pass
NVNT	3-DH1	2441	2.42	21	Pass
NVNT	3-DH1	2480	1.33	21	Pass

,TC

3C

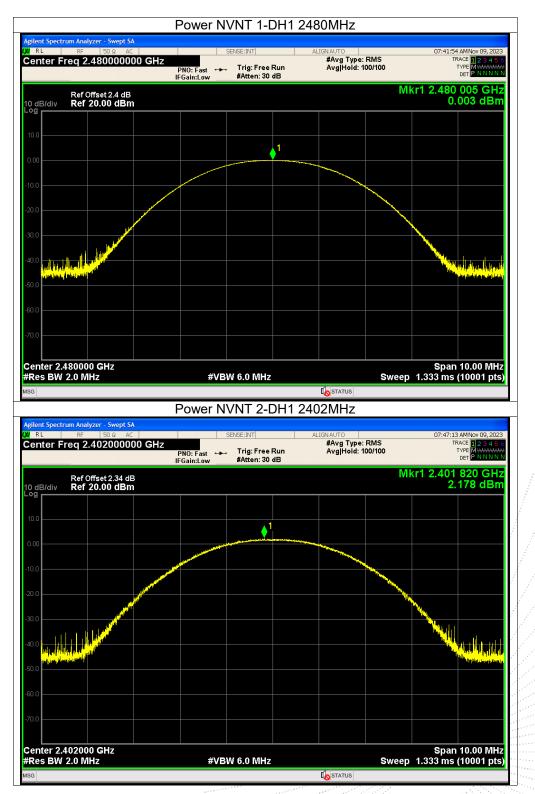
测





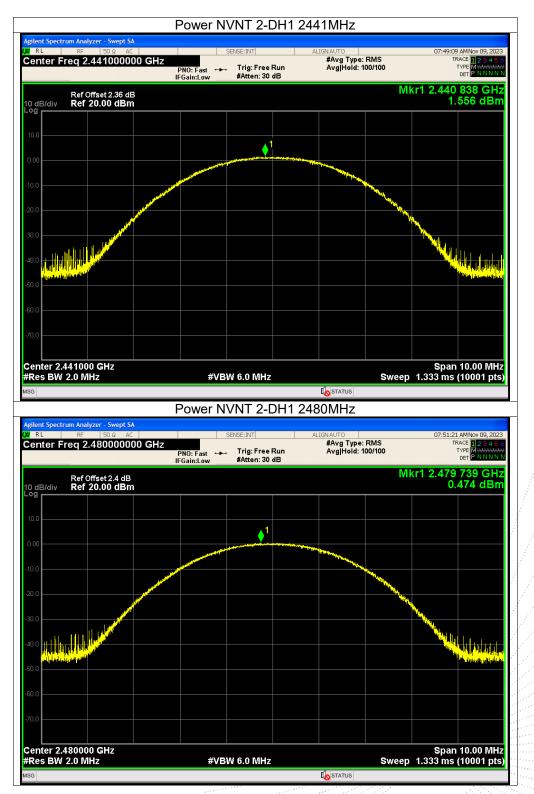




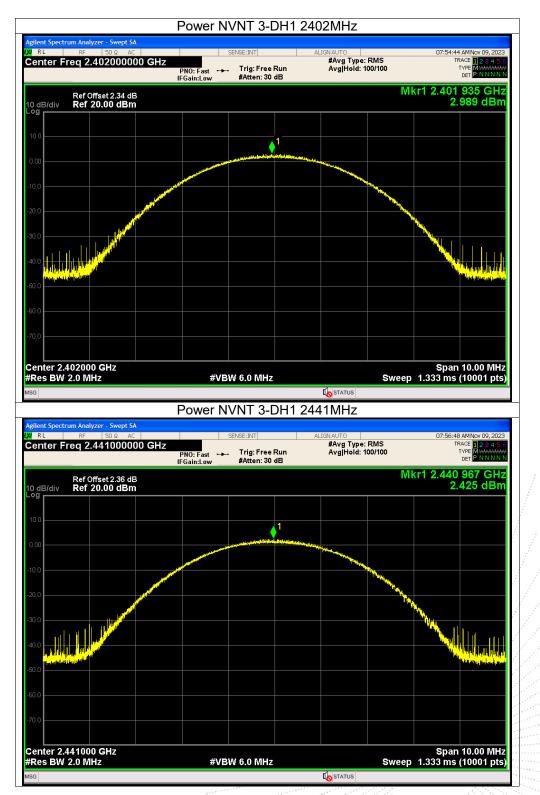






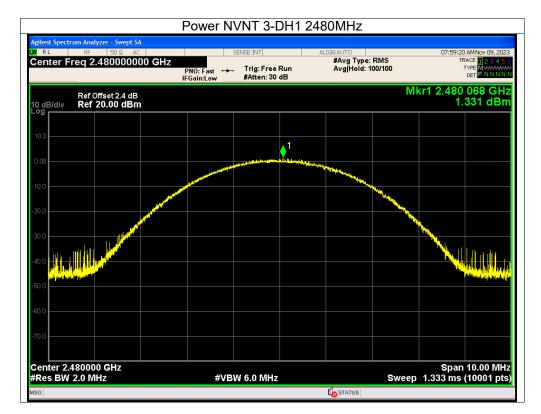














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## 12. Hopping Channel Separation

## 12.1 Block Diagram Of Test Setup



## 12.2 Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.

### 12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

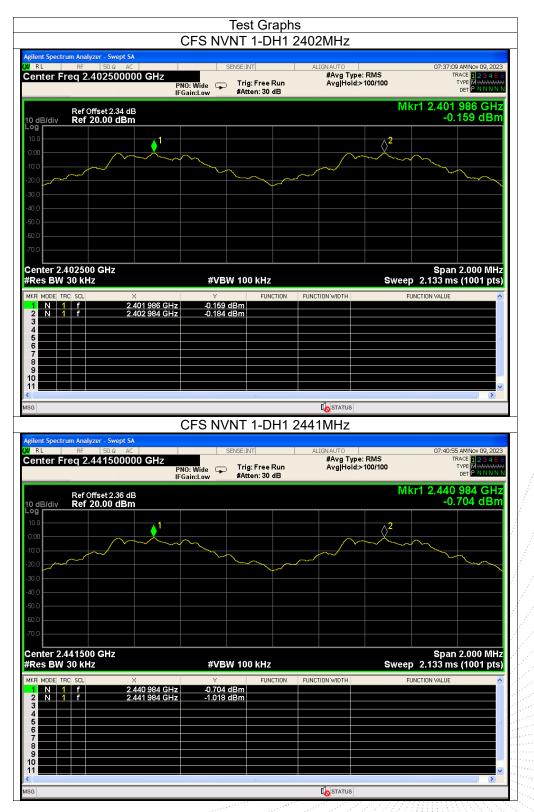
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

odulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low Markey	0.998	0.611	PASS
GFSK	Middle	1.000	0.606	PASS
GFSK	High Mark	1.000	0.614	PASS
π/4 DQPSK	Low	1.002	0.827	PASS
π/4 DQPSK	Middle	1.000	0.827	PASS
π/4 DQPSK	High	1.002	0.826	PASS
8DPSK	Low	1.000	0.803	PASS
8DPSK	Middle	1.002	0.805	PASS
8DPSK	High	0.998	0.805	PASS

#### 12.4 Test Result

ТC











rilent Spectrum Analyzer - RL RF 5	50 Ω AC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	07:44:30 AMNov 09, 2023
enter Freq 2.479	PNO:	Wide 🍙 Trig: Free Run n:Low #Atten: 30 dB	Avg Hold:>100/100	TRACE 12345 TYPE MWWWWW DET PNNNN
Ref Offse dB/div <b>Ref 20.0</b>	t 2.4 dB 00 dBm			Mkr1 2.478 984 GHz -1.760 dBm
o.0	1			2
0.0		$\sim$		~~~~~~
		hard the second		
0.0				
0.0				
0.0				
enter 2.479500 G	Hz			Span 2.000 MHz
Res BW 30 kHz	¥	#VBW 100 kHz	FUNCTION WIDTH	sweep 2.133 ms (1001 pts)
KR MODE TRC SCL 1 N 1 f 2 N 1 f	× 2.478 984 GHz 2.479 984 GHz	Y FUNCTION -1.760 dBm -1.871 dBm		FUNCTION VALUE
3				
5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7				
8				
1				~
G				
			STATUS	
		FS NVNT 2-DH1		
i <mark>lent Spectrum Analyzer</mark> - R L RF 5	- Swept SA 50 Ω AC	FS NVNT 2-DH1	2402MHz	07:47:55 AMNoy 09, 2023 TRACE 12 2 3 4 5
i <mark>lent Spectrum Analyzer</mark> - R L RF 5	50 Ω AC 2500000 GHz PNO:		2402MHz	TRACE 1 2 3 4 5
ilent Spectrum Analyzer RL RF S enter Freq 2.402 Ref Offse	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz ALIGN AUTO #Avg Type: RMS	TRACE 12345 TYPE MUNICAL DET PINNN Mkr1 2.401 984 GHz
RL RF	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
Ilent Spectrum Analyzer RL RF enter Freq 2.402 Ref Offse dB/div Ref 20.0 9 0 0	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz ALIGN AUTO #Avg Type: RMS	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
Ilent Spectrum Analyzer RL RF enter Freq 2.402 Ref Offse 0 dB/div Ref 20.0 0 0 0 0 0 0 0 0	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
RL RF	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
Ref Offse RE Ref Offse dB/div Ref 2.402	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
ilent Spectrum Analyzer RL RF E enter Freq 2.402 Ref Offse	Swept SA 50 Ω AC     25000000 GHz PNO: IFGai t 2.34 dB	SENSE:INT	2402MHz	TRACE 12.3.4 5 TYPE MYMMWD Der P NNNN Mkr1 2.401 984 GHz -0.157 dBm
Ref Offse RE Ref Offse dB/div Ref 2.402 Ref Offse dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 50 Ω AC   25000000 GHz PNO: IFGai t2.34 dB	SENSE:INT	2402MHz	TRACE 12 34 5 TYPE MYWHAT DET P NNNN Mkr1 2.401 984 GHz -0.157 dBm
ilent Spectrum Analyzer - RL RF E enter Freq 2.402 Ref Offse dB/div Ref 20.0 9 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 50 Q AC   PNO: PRO: IFGai t2.34 dB 00 dBm	SENSE:INT	2402MHz	TRACE 12 3 4 5 TYPE MYSHOWSHIP OF PNNNN Mkr1 2.401 984 GHz -0.157 dBm 2 2 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7 7 7 7
Ilent Spectrum Analyzer - RL RF E enter Freq 2.402 Ref Offse d B/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 30 Q AC PRO-	SENSE:INT Wide m:Low Trig: Free Run #Atten: 30 dB	2402MHz	2 Mkr1 2.401 984 GHz -0.157 dBm
Ilent Spectrum Analyzer RL RF F enter Freq 2.402 Ref Offse 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0	Swept SA SO Q. AC.   PNO: IFGai t2.34 dB D0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:INT Wide n:Low #Atten: 30 dB	2402MHz	TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 dBm           Sweep 2.133 ms (1001 pts)         -0.157 dBm
Ref         Offse           0         0 </td <td>Swept SA SO Q AC   PNO: PNO: IFGai t2.34 dB 00 dBm 1 1 4 1 4 2.401 984 GHz</td> <td>SENSE:INT</td> <td>2402MHz</td> <td>TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 dBm           Sweep 2.133 ms (1001 pts)         -0.157 dBm</td>	Swept SA SO Q AC   PNO: PNO: IFGai t2.34 dB 00 dBm 1 1 4 1 4 2.401 984 GHz	SENSE:INT	2402MHz	TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 dBm           Sweep 2.133 ms (1001 pts)         -0.157 dBm
Ilent Spectrum Analyzer -       Rt     Ref Offse       Ref Offse       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       0     G     G       1     H     G       2     N     1       1     G     G       1     G     G	Swept SA SO Q AC   PNO: PNO: IFGai t2.34 dB 00 dBm 1 1 4 1 4 2.401 984 GHz	SENSE:INT	2402MHz	TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 gm           Sweep 2.133 ms (1001 pts)         -0.157 gm
Ilent Spectrum Analyzer           RL         RF         F           enter Freq 2.402           Ref Offse           0 dB/div         Ref 20.00           0 dB/div         Ref 20.00 <tr< td=""><td>Swept SA SO Q AC   PNO: PNO: IFGai t2.34 dB 00 dBm 1 1 4 1 4 2.401 984 GHz</td><td>SENSE:INT</td><td>2402MHz</td><td>TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 dBm           Sweep 2.133 ms (1001 pts)         -0.157 dBm</td></tr<>	Swept SA SO Q AC   PNO: PNO: IFGai t2.34 dB 00 dBm 1 1 4 1 4 2.401 984 GHz	SENSE:INT	2402MHz	TRACE         12.345           Type         Mkr1 2.401 984 GHz           -0.157 dBm         -0.157 dBm           2         -0.157 dBm           Span 2.000 MHz         -0.157 dBm           Sweep 2.133 ms (1001 pts)         -0.157 dBm

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AC AC	CENCE-TNIT	2441MHz	07,40-53	AMNov 00, 2022
000 GHz PNO: Wide	Trig: Free Run	#Avg Type: RMS	тг 00	3 AMNov 09, 2023 RACE 1 2 3 4 5 TYPE MWWWW DET P N N N N
dB 3m			Mkr1 2.440 -0.	984 GHz 747 dBm
	~~~~~		¢ <sup>2</sup>	- mm
	#VBW 100 kHz		Span Sweep 2.133 ms	2.000 MHz 5 (1001 pts)
2.440 984 GHz C 2.441 984 GHz C	0.991 dBm	Destatus		×
CFS	NVNT 2-DH1			
			т 00	3 AMNOV 09, 2023 RACE 1 2 3 4 5 TYPE MWWWWW DET P N N N N
aB Bm			Mkr1 2.478 -1.	984 GHz 773 dBm
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		¢ <sup>2</sup>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	#VBW 100 kHz			2.000 MHz (1001 pts)
× 2.478 984 GHz	Y FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	^
2.479 986 GHz	I.784 dBm			
	PNO: Wide IFGain:Low dB m 2.440 984 GHz 2.441 984 GHz 2.441 984 GHz CCFS CCFS SA AC 000 GHz PNO: Wide IFGain:Low B B m	OUO GHZ PRO: Wide IFGainLow Atten: 30 dB dB dB dB dB dB dB dB dB dB	Avg Type: RMS Avg[Hold>100/H #Atten: 30 dB	OOD GHZ     Trig: Free Run Addition tow     Addition tow     Mkr1 2.440       dB     Mkr1 2.440       dB     0       dB

n CO.,LT



Ient Spectrum Analyzer RL RF	- Swept SA 50 Ω AC	SENSE:IN	Т	ALIGN AUTO		07:55:40	) AMNov 09, 2023
enter Freq 2.402	PNO		: Free Run en: 30 dB	#Avg Type Avg Hold:		TF	RACE 12345 TYPE MWWWWW DET PNNNN
Ref Offse dB/div Ref 20.1					Mk	r1 2.401 -0.	986 GHz 061 dBm
2.0	1				<mark>2</mark>		
		$\sim$				<u>~-</u> ~	
						~~	
0.0							
).0 ).0							
0.0							
).0							
enter 2.402500 G Res BW 30 kHz	iHz	#VBW 100	kHz		Sweep	Span 2.133 ms	2.000 MHz (1001 pts
R MODE TRC SCL	× 2.401 986 GHz	۲ -0.061 dBm	FUNCTION	FUNCTION WIDTH	FU	NCTION VALUE	^
2 N 1 f	2.402 986 GHz	-0.121 dBm					
							>
				STATUS			
-	C	FS NVNT	3-DH1 2	441MHz			
lent Spectrum Analyzer	- Swept SA	FS NVNT		441MHz			
lent Spectrum Analyzer R L RF !	- Swept SA 50 Ω AC	SENSE:IN	T : Free Run		: RMS	07:57:52 Tf	
lent Spectrum Analyzer RL RF enter Freq 2.44	- Swept SA 50 Ω AC 15000000 GHz PNO IFGa	SENSE:IN	Т	A441MHz	≥: RMS >100/100	TF	TYPE NNNN DET PNNNN
lent. Spectrum Analyzer RL RF enter Freq 2.44 Ref Offse dB/div Ref 201	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	≥: RMS >100/100	r1 2.440	
Ient Spectrum Analyzer RL RF P enter Freq 2.44 Ref Offse	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	2 AMNov 09, 2023 RACE 11 2 3 4 5 TYPE MANANA DET P MANANA 984 GHz 704 dBm
RL RF RF RF RF Offse dB/div Ref 2.44	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	≥: RMS >100/100	r1 2.440	
RL RF RF RF RF Offse	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	
RE Ref Offse	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	
RE Spectrum Analyzer RL RF Senter Freq 2.44' Ref Offse dB/div Ref 20.1	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	
Ient Spectrum Analyzer RL RF enter Freq 2.44 Ref Offse dB/div Ref 20.1	- Swept SA 50 Q AC 1500000 GHz PRO IFGa et 2.36 dB	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	
RL RF Preq 2.44	- Swept SA 50 Q AC 1500000 GHz PRO IFGa at 2.36 dB 00 dBm	SENSE:IN	T : Free Run	A441MHz	e: RMS ≻100/100 Mik	r1 2.440	
Ref Offse RE Ref Offse B/div Ref 20.1 Ref Offse dB/div Ref 20.1 Ref 0 Ref	- Swept SA 50 Q AC 1500000 GHz PRO IFGa at 2.36 dB 00 dBm	SENSE:IN I: Wide iin:Low #Attr	T Free Run en: 30 dB	A441MHz	E: RMS >100/100	r1 2.440 -0.	2.000 MH2
Ref Offse RE Ref Offse B/div Ref 2.44 Ref Offse dB/div Ref 20.1 Ref 0 Ref	- Swept SA 50 Q AC 1500000 GHz PRO IFGa at 2.36 dB 00 dBm 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:IN I: Wide in:Low Trig #Atte	T Free Run en: 30 dB	A441MHz	e: RMS >100/100 Mk	r1 2.440 -0.	2.000 MH2
Ref Offse RE Ref Offse Bl/div Ref 20.1 Ref Offse dB/div Ref 20.1 Ref 0 Comparison Ref 0 Ref	- Swept SA 50 Q AC 1500000 GHz PNO IFGa at 2.36 dB 00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:IN Wide Trig: #Atto	T Free Run en: 30 dB	441MHz	e: RMS >100/100 Mk	r1 2.440 -0.	2.000 MH2
Ref Offse Briter Freq 2.44 Ref Offse Briter Ref 20.1 Ref Offse Briter Ref 20.1 Ref 2	- Swept SA 50 Q AC 1500000 GHz PNO IFG2 st 2.36 dB 00 dBm 1 1 4 1 4 2.440 984 GHz	SENSE:IN Wide Trig #Atto #VBW 1000 Y -0.704 dBm	T Free Run en: 30 dB	441MHz	e: RMS >100/100 Mk	r1 2.440 -0.	
Ient Spectrum Analyzer RL RF 1 enter Freq 2.44 Ref Offse dB/div Ref 20.1 9 0 0 0 0 0 0 0 0 0 0 0 0 0	- Swept SA 50 Q AC 1500000 GHz PNO IFG2 st 2.36 dB 00 dBm 1 1 4 1 4 2.440 984 GHz	SENSE:IN Wide Trig #Atto #VBW 1000 Y -0.704 dBm	T Free Run en: 30 dB	441MHz	e: RMS >100/100 Mk	r1 2.440 -0.	2.000 MH2
Ient Spectrum Analyzer RL RF Offse onter Freq 2.44 Ref Offse dB/div Ref 20.1 9 0 0 0 0 0 0 0 0 0 0 0 0 0	- Swept SA 50 Q AC 1500000 GHz PNO IFG2 st 2.36 dB 00 dBm 1 1 4 1 4 2.440 984 GHz	SENSE:IN Wide Trig #Atto #VBW 1000 Y -0.704 dBm	T Free Run en: 30 dB	441MHz	e: RMS >100/100 Mk	r1 2.440 -0.	2.000 MH2

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		CFS NVNT	3-DH1 2	2480MHz		
Agilent Spectrun	n Analyzer - Swept SA RF 50 Ω AC	SENSE:)	The LTT	ALIGNAUTO		08:00:25 AM Nov 09, 2023
	eq 2.479500000 GHz	PNO: Wide 👝 Tri	g: Free Run tten: 30 dB	#Avg Ty	e: RMS i:>100/100	08:00:25 AMNOV 09, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N
	Ref Offset 2.4 dB Ref 20.00 dBm				Mk	r1 2.478 986 GHz -1.809 dBm
10.0 0.00					2	
-10.0 -20.0 -30.0						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-40.0						
-70.0						
Center 2.47 #Res BW 3		#VBW 10	0 kHz		Sweep	Span 2.000 MHz 2.133 ms (1001 pts)
MKR MODE TRC	SCL X f 2.478 986 G	Y Hz -1.809 dBm	FUNCTION	FUNCTION WIDTH	FUI	NCTION VALUE
2 N 1 3 4 5 5	f 2.479 984 G					
6 7 8 9 10						
11 <b></b>			Ш			×
ISG						





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## 13. Number Of Hopping Frequency

#### 13.1 Block Diagram Of Test Setup



## 13.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

## 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz, Sweep=auto;

### 13.4 Test Result

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass

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	Hope	Test oing No. NV	Graph		-		
lent Spectrum Analyze		ong No. Nv			Z		
RL RF enter Freq 2.44	PN		Free Run n: 30 dB	ALIGNAUTO #Avg Type: Avg Hold:>		08:05:35 AM Nov 09, 21 TRACE 1234 TYPE MWWW DET PNNN	· 5 6
	et 2.36 dB .00 dBm				Mkr1 :	2.402 004 0 GH 0.889 dB	
dB/div Ref 20							
			MMMM	MMMMMM			
0.0 /							Her
art 2.40000 GH2 Res BW 100 kHz		#VBW 300	kHz		Sweep	Stop 2.48350 Gi 8.000 ms (1001 pi	
	× 2.402 004 0 GHz	Y 0.889 dBm	FUNCTION	FUNCTION WIDTH		TION VALUE	
2 N 1 f	2.480 160 0 GHz	-0.474 dBm					
4 5 6							8
							~
3			Ш	<b>I</b> STATUS		>	
	Норр	oing No. NV	NT 2-D		z		
lent Spectrum Analyze RL RF	- Swept SA 50 Ω AC	SENSE:INT	1	ALIGN AUTO		08:10:25 AMNov 09, 2	2023
enter Freq 2.44	1750000 GHz	0: Fast 😱 Trig:	Free Run	#Avg Type: Avg Hold:>		TRACE 1234 TYPE MWWW DET P N N N	56 /////
Ref Offs	et 2.36 dB	ain:Low #Atte	n: 30 dB		Mkr1 :	2.401 670 0 GH	Hz
	.00 dBm					-4.174 dB	m
00 <b>1</b>		ኒሊዲኮቢ ሲቢሌሌሲላካ	ሲከልለስስኪ	1.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ.ስ	ብስለለስለአስ	2	
				**********	1.0	1944494988999	
).0							
).0 <b> </b>							
).0							WH.
).0							
art 2.40000 GHz Res BW 100 kHz		#VBW 300	kHz		Sweep	Stop 2.48350 Gi 8.000 ms (1001 pi	
R MODE TRC SCL	× 2.401 670 0 GHz	۲ -4.174 dBm	FUNCTION	FUNCTION WIDTH	FUNC	TION VALUE	
2 N 1 f	2.479 993 0 GHz	-0.446 dBm					
							в
							Í
4 5 5 5 5 7							
							~





Нор	ping No. NVN	Г 3-DH1 2441N	MHz	
	SENSE:INT SENSE:INT PNO: Fast Trig: Fre Gain:Low #Atten: 3	eRun Avg Ho	ype: RMS Id:≻100/100	08:15:44 AMNov 09, 2023 TRACE 123456 TYPE MWWWW DET PNNNN
Ref Offset 2.36 dB           10 dB/div         Ref 20.00 dBm           10.0				.401 586 5 GHz -5.349 dBm
Start 2.40000 GHz #Res BW 100 kHz	#VBW 300 kH		· · · · ·	Stop 2.48350 GHz 3.000 ms (1001 pts)
MKR MODE         TRC         SCL         ×           1         N         1         f         2.401 586 5 GHz           2         N         1         f         2.403 327 0 GHz           3         1         f         2.480 327 0 GHz           4         -         -         -           5         -         -         -           6         -         -         -           7         -         -         -           9         -         -         -           11         -         -         -		INCTION FUNCTION WIDTH		ION VALUE
MSG		Ko STATUS	3	



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## 14. Dwell Time

## 14.1 Block Diagram Of Test Setup



### 14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

## 14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

#### 14.4 Test Result

DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows: DH5:1600/79/6\*0.4\*79\*(MkrDelta)/1000 DH3:1600/79/4\*0.4\*79\*(MkrDelta)/1000

DH1:1600/79/2\*0.4\*79\*(MkrDelta)/1000

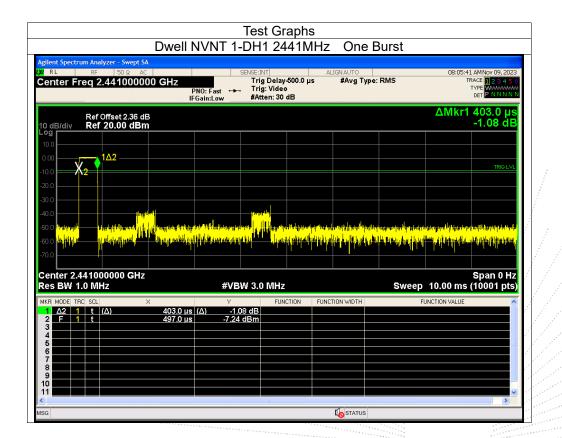
Remark: Mkr Delta is once pulse time.

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Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
		1DH1	0.403	0.129	0.4
GFSK	Middle	1DH3	1.659	0.265	0.4
		1DH5	2.906	0.310	0.4
		2DH1	0.410	0.131	0.4
π/ 4 DQPSK	Middle	2DH3	1.665	0.266	0.4
		2DH5	2.913	0.311	0.4
		3DH1	0.414	0.132	0.4
8DPSK	Middle	3DH3	1.661	0.266	0.4
		3DH5	2.913	0.311	0.4



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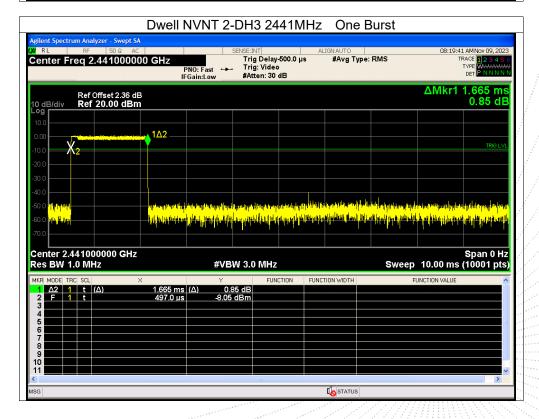
Agilent Spectrum Analyzer - Swept SA VI RL RE 50 g AC Center Freq 2.44100000 Ref Offset 2.36 dE	00 GHz	PNO: Fast 🔸	SE:INT Trig Delay-500.0 Trig: Video	ALIGNAUTO	ype: RMS	08:18:00 AMNov TRACE	
Ref Offset 2.36 dB		Gain:Low	#Atten: 30 dB			DET P	NNNN
10 dB/div Ref 20.00 dBm						ΔMkr1 1.65 4.5	9 ms 8 dE
10.0 0.00	1∆2						
-10.0 X2							TRIG LVL
-30.0							
-60.0 44-9440 -60.0 46145 4647 -70.0						yberh forely non-places and the sho Charles paylon yberhaid glace position I	illine ver lå <mark>Hene ver lå</mark> Hene ver lå
Center 2.441000000 GHz Res BW 1.0 MHz		#VBW	3.0 MHz		Sweep	Spar 10.00 ms (1000	n 0 H: 91 pts
MKR MODE TRC SCL >> 1 Δ2 1 t (Δ) 2 F 1 t 3 4	< <u>1.659 ms</u> 497.0 μs	γ (Δ) 4.58 ( -8.74 dE		FUNCTION WIDTH	FL	INCTION VALUE	
5 6 7 8 7							
9							

	Dwell	NVNT 1-	DH5 24	41IVIHZ	One E	Burst		
Agilent Spectrum Analyzer - S R RL RF 50 Center Freq 2.4410	Ω AC 000000 GHz	PNO: Fast	SENSE:INT Trig Delay Trig: Video #Atten: 30	-500.0 µs	IGNAUTO #Avg Type:	RMS		D AMNOV 09, 202 RACE 1 2 3 4 5 TYPE WAWAAA DET P N N N
Ref Offset 2 10 dB/div Ref 20.00							ΔMkr1	2.906 m 4.99 dl
10.0		1Δ2						
-10.0 <mark>- X2</mark>								TRIG LV
30.0								
40.0								
50.0 <mark>4/0<sub>11</sub>-12</mark>		alan araa				and plant and the		
50.0 <mark>4/4539</mark> 60.0 <mark>40 4549</mark>						a pailadhachadhachadh Magaille sa sa la <sup>11</sup> a a an ban		
50.0 1/1/1/1/ 60.0 1/1/1/1/ 70.0 Senter 2.441000000	GHz					<mark>in tail tail tail tail tail tail tail tail</mark>		Span 0 H
600 1/41 уг 600 1/41 уг 700 Сепter 2.441000000 Res BW 1.0 MHz икя моде твс! scl.	×	<b>#VBI</b>	W 3.0 MHz	<mark>1140-1</mark> 18940-114944		Sweep	<mark>die plaats die begeleiten.</mark> Die plaats die	Span 0 H
500         1/(1))           600         1/(1))           600         1/(1))           600         1/(1))           600         1/(1))           600         1/(1))           600         1/(1))           600         1/(1))           1         02           2         F           1         t           2         F		#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H
60 0         (/(type))           60 0         (/(type))           60 0         (/(type))           80 0         (/(type))	× 2.906 ms	#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H
500         (1/1)           500         (1/1)	× 2.906 ms	#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H
600         ν(try p)           600         ν(try p)           700         ν(try p)           Center 2.441000000         Res BW 1.0 MHz           4         Λ2         1         t           4         Λ2         1         t         (Δ)           5	× 2.906 ms	#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H
50 0         μ         μ           60 0         μ         μ           60 0         μ         μ           20         μ         μ           2enter 2.44 1000000         tes BW 1.0 MHz           2enter 2.42 1 t         (Δ)           1         Δ2         1           2         F         1           3         4         4           5         4         4           6         4         4           7         4         4           8         4         4	× 2.906 ms	#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H
600         ν(try p)           600         ν(try p)           700         ν(try p)           Center 2.441000000         Res BW 1.0 MHz           4         Λ2         1         t           4         Λ2         1         t         (Δ)           5	× 2.906 ms	#VB\ s (Δ) 4.9	W 3.0 MHz	<mark>1140-1</mark> 18940-114944	<mark>alatik (kanalatik) (ka</mark>	Sweep	10.00 ms	Span 0 H





Dwell	NVNT 2-DH	1 2441MHz	One Burst	
Agilent Spectrum Analyzer - Swept SA Off RL RF 50 Q AC Center Freq 2.441000000 GHz	PNO: Fast +++ Tri	NT A g Delay-500.0 μs g: Video ten: 30 dB	LIGN AUTO #Avg Type: RMS	08:10:31 AMNoy 09, 2023 TRACE 112:34 5 6 TYPE WWWWWW DET PINNNIN
-70.0				in an
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0	) MHz	Sw	Span 0 Hz eep   10.00 ms (10001 pts)
MKR         MODE         TRC         SCL         ×           1         Δ2         1         t         Δ3         410.0 µ           2         F         1         t         348.0 µ           3         4         4         4         4           5         5         5         5         5           6         7         7         7         7         7           9         10         11         11         11         11		FUNCTION FUNC	CTION WIDTH	FUNCTION VALUE
MSG				



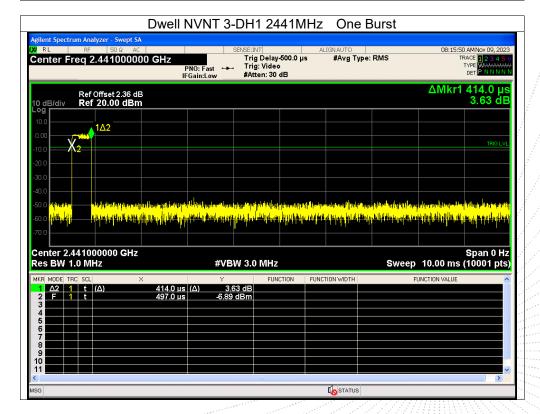


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Dwell	NVNT 2-DH5 2441MHz	One Burst
Agilent Spectrum Analyzer - Swept SA Of RL RF 50 Q AC Center Freq 2.441000000 GHz	SENSE:INT AL Trig Delay-500.0 µs PNO: Fast → Trig: Video IFGain:Low #Atten: 30 dB	IGNAUTO 08:20:41 AMNov 09, 2023 #Avg Type: RMS TRACE 12 3:4 5 6 TYPE DET PNNNN DET PNNNNN
Ref Offset 2.36 dB           10 dB/div         Ref 20.00 dBm           10 0		ΔMkr1 2.913 ms 2.26 dB
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	Span 0 Hz Sweep 10.00 ms (10001 pts)
MKR         MODE         TRC         SCL         ×           1         Δ2         1         t         (Δ)         2.913 m.           2         F         1         t         (Δ)         2.913 m.           3         -         -         -         497.0 μ.           5         -         -         -         -           6         -         -         -         -           7         -         -         -         -           9         -         -         -         -           10         -         -         -         -         -	s (Δ) 2.26 dB	TION WIDTH FUNCTION VALUE
MSG		In STATUS







	Dwell I	NVNT 3-	DH3 24	41MH	z One	e Burst		
agilent Spectrum Analyzer - Swept SA RL RF 50Ω AC Center Freq 2.44100000	00 GHz	SE PNO: Fast ↔→	NSE:INT Trig Delay Trig: Video #Atten: 30	• ·	ALIGNAUTO #Avg T	ype: RMS		32 AMNov 09, 202 IRACE 12345 TYPE WWWWW DET PNNNN
Ref Offset 2.36 dE 10 dB/div Ref 20.00 dBm							ΔMkr1	1.661 m 1.21 di
10.0 0.00	1Δ2							
								TRIG LV
-30.0					an ala status	NUT .		
50.0 <mark>вода 60.0 <mark>вода</mark> 70.0</mark>		Novel of a state of the state o			n sie de la composition Al la Catton Incal D		a di angli fabita danta fan 1 ni si sana di gala fabita ya 1	
Center 2.441000000 GHz Res BW 1.0 MHz		#VBW	/ 3.0 MHz			Swe	ep 10.00 ms	Span 0 H (10001 pt
MKR MODE TRC SCL >> 1 Δ2 1 t (Δ) 2 F 1 t 3	<1.661 ms 346.0 μs	γ (Δ) 1.21 -13.63 d	dB	CTION FL	INCTION WIDTH		FUNCTION VALUE	
4 5 6 7								
8								
9 10 11								

gilent Spectrum Analyzer - Sw						
RL RF 50 Ω			SE:INT	ALIGN AUTO		08:22:50 AMNov 09, 2
enter Freq 2.44100		PNO: Fast ↔	Trig Delay-500 Trig: Video #Atten: 30 dB	).0 µs #Avg 1	Гуре: RMS	TRACE 1234 TYPE WAAAA DET P N N
		Gam.eow				ΔMkr1 2.913 r
Ref Offset 2. dB/div Ref 20.00						1.16
og						
	and the second secon	LNA 1∆2				TRIG
Xstulation	<mark>d Harld Alband Kab</mark>	Put -				
0.0	· · · ·					
0.0						
40.0						
0.0 0.0		n tij bi og i tij den	hilantillepential	den et abgehörden av filter ber	isti oler heise störlige hå	da an la seconda da di sedi se di sedi se
			dalaan dagaa dada waxay dagaa daga	alatan di Alika palajan dan milan di san dan di san di Ta kana san di san d	intenting to be to post of the toget of a	Handan yan salar salar dari salar yang bertakan Mana ang Dapan salar salar dari salar salar salar salar salar
0.0			televentleren politik Seventleren politik	alata di Antan pola a la parta ( angle Mangan di Antan di Antan di Angle	deli edi edi para parti tertera <sup>11</sup> de la prime di ser parti para di t	alay na kana a kata na kana ka kana kana kan
0.0 <b>Her</b> 0.0 <b>Her</b> 0.0	GHz	<mark>a tri Kantun</mark> ia A <mark>batun kalan</mark> an	dellandel Bergene i ded Antonip i della tergene	later (1903) a bada a Circlet (1991) 18. a circlet (1991) 19. a circlet (1991)	teli ele bri pretenter <sup>b</sup> é Gefén <mark>tele en ele terrete</mark>	ia a da ay 11 ying ang pinang pina ying bayang pina Ing pinang pin Ing pinang pi
enter 2.441000000 0	GHz		3.0 MHz	hann an an the ann an ann an ann an ann an ann an ann an a	in the second	<mark></mark>
0.0 Hor 0.0 Min enter 2.441000000 C es BW 1.0 MHz KR MODE TRC SCL	×	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0
0.0 μητ 0.0 μητ enter 2.441000000 ( es BW 1.0 MHz KR MODE TRC SCL 1 Δ2 1 t (Δ)	× 2.913 ms	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p
0.0 μγγ enter 2.441000000 ( es BW 1.0 MHz KR MODE TRC SCL 1 Δ2 1 t (Δ) 2 F 1 t	×	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p
0.0 1.0 0.0	× 2.913 ms	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	× 2.913 ms	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p
0.0         μ           0.0         μ           enter 2.441000000 (cs           es BW 1.0 MHz           KR           MODE         TRC           2         F           1         t           3         -           4         -           5         -           6         -           7         -	× 2.913 ms	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p
0.0 μ(μ) enter 2.441000000 ( es BW 1.0 MHz RI MODE TRC SCL 1 Δ2 1 t (Δ) 2 F 1 t 3 4 4 5 5 6 6 6 6 6	× 2.913 ms	#VBW	3.0 MHz	iar ma tan an a	Sweep	Span 0 10.00 ms (10001 p



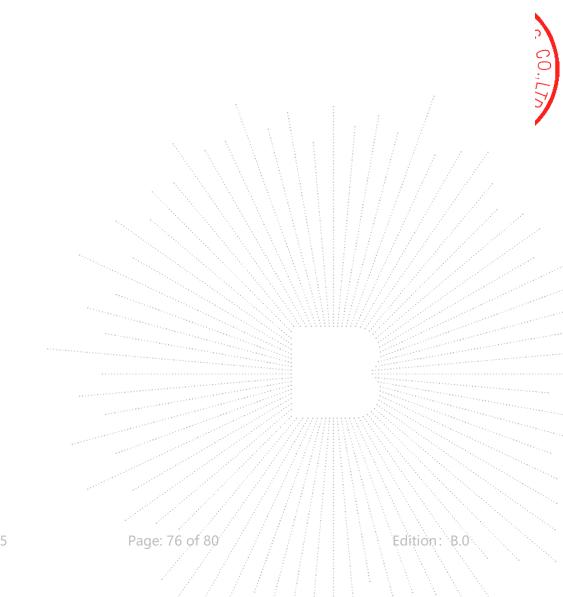
## 15. Antenna Requirement

#### 15.1 Limit

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

#### 15.2 Test Result

The EUT antenna is Chip antenna, fulfill the requirement of this section.



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## 16. EUT Photographs

EUT Photo





NOTE: Appendix-Photographs Of EUT Constructional Details

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# 17. EUT Test Setup Photographs

Conducted emissions



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Radiated Measurement Photos



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TEST

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## STATEMENT

- 1. The equipment lists are traceable to the national reference standards.
- 2. The test report can not be partially copied unless prior written approval is issued from our lab.
- 3. The test report is invalid without the "special seal for inspection and testing".
- 4. The test report is invalid without the signature of the approver.
- 5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

E-Mail: bctc@bctc-lab.com.cn

\*\*\*\*\* END \*\*\*\*\*

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